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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,445	10/03/2003	George J. Kluth	0180146	5339
25700	7590	10/22/2004	EXAMINER	
FARJAMI & FARJAMI LLP 26522 LA ALAMEDA AVENUE, SUITE 360 MISSION VIEJO, CA 92691			TRAN, THIEN F	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 10/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/678,445

Applicant(s)

KLUTH ET AL.

Examiner

Thien F Tran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 16-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 16-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Election/Restrictions***

Applicant's election without traverse of claims 1-8 and 16-20 in the reply filed on 09/22/2004 is acknowledged.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 4-5, 7-8, 16 and 18-20 are rejected under 35 U.S.C. 102(a) as being anticipated by Arghavani et al. (US 6,620,713).

Arghavani et al. discloses the claimed method of forming a field-effect transistor 200 on a substrate 210 (see Figure 3), said method comprising steps of: forming a high-k dielectric layer 212 over said substrate; forming a first polysilicon layer 214 over said high-k dielectric layer, said first polysilicon layer 214 being formed by utilizing a precursor that does not comprise hydrogen.

Regarding claim 2, Arghavani further discloses a step of forming a second polysilicon layer 216 over said first polysilicon layer.

Regarding claim 4, said second polysilicon layer 216 is formed by utilizing a precursor that comprises said hydrogen, said first polysilicon layer 214 preventing said hydrogen from interacting with said high-k dielectric layer 212 (col. 6, lines 45-59).

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Regarding claim 5, said first polysilicon layer 214 has a thickness of between approximately 50.0 Angstroms and approximately 200.0 Angstroms.

Regarding claim 7, said high-k dielectric layer 212 is selected from the group consisting of hafnium oxide and zirconium oxide.

Regarding claim 8, said step of forming said first polysilicon layer 214 over said high-k dielectric layer 212 comprises utilizing a physical vapor deposition (col. 6, lines 25-27).

Regarding claim 16, Arghavani et al. discloses the claimed method of forming a field-effect transistor 200 on a substrate 210 (see Figure 2A), said method comprising steps of: forming a high-k dielectric layer 212 over said substrate; forming a gate electrode layer 215 of polysilicon over said high-k dielectric layer, said gate electrode layer being formed by utilizing a precursor that does not comprise hydrogen.

Regarding claim 18, said step of forming said gate electrode layer 215 over said high-k dielectric layer 212 comprises utilizing a physical vapor deposition (col. 4, lines 47-49).

Regarding claim 19, said high-k dielectric layer 212 is selected from the group consisting of hafnium oxide and zirconium oxide.

Regarding claim 20, said gate electrode layer 215 has a thickness of between approximately 1000 to 2000 angstroms.

Claims 1, 3, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Halliyal et al. (US 6,451,641).

Halliyal et al. discloses the claimed method of forming a field-effect transistor 100 on a substrate 102 (see Figure 1), said method comprising steps of: forming a high-k dielectric layer 108 over said substrate; forming a gate electrode layer 110 of polysilicon over said high-k dielectric layer, said polysilicon gate electrode layer 110 being formed by utilizing a precursor that does not comprise hydrogen.

Regarding claims 3 and 17, the step of forming the polysilicon gate electrode layer 110 over the high-k dielectric layer 108 comprises utilizing a silicon tetrachloride precursor (col. 7, lines 25-31) in an atomic layer deposition ALCVD process (col. 9, lines 15-18).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arghavani et al. (US 6,620,713).

Arghavani does not specifically disclose the gate electrode stack (214, 216) of Figure 3 having a thickness as claimed. However, Arghavani et al. discloses the gate electrode 215 of the transistor (Figure 2A) having a thickness of approximately 1000 to 2000 angstroms depending on application. Therefore, forming the gate electrode stack (214, 216) having the thickness of approximately 1000 to 2000 angstroms as claimed would have been prima facie obvious. Furthermore, it would have been obvious to one

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having ordinary skill in the art at the time the invention was made to form the gate electrode stack having the claimed range of thickness, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. In re Daily, 93 USPQ 47 (CCPA 1966), the court held that changes in size and shape of parts of an invention in the absence of an unexpected result involves routine skill in the art. Additionally, In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien F Tran whose telephone number is (571) 272-1665. The examiner can normally be reached on 8:30AM - 5:00PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (571) 272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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October 20, 2004



**THIEN TRAN**  
**PRIMARY EXAMINER**